CLAIMS

That which is claimed is:

1. A tool providing interactive capabilities for user involvement in extracting and disambiguating biological information in text, said tool comprising:

a text viewer into which at least a portion of a textual document may be imported and viewed;

means for text mining the at least a portion of a textual document having been imported into the text viewer;

a list-based text editor that lists entities and interactions having been identified by said means for text mining; and

means for assigning directionality to the listed interactions.

2. The tool of claim 1, further comprising means for representing the entities and interactions having been identified in a local format.

3. The tool of claim 2, further comprising means for generating, displaying and interactively manipulating a biological diagram, based upon the entities and interactions represented in said local format.

4. The tool of claim 1, wherein each said entity and interaction listed points back to a location of the portion of the textual document where it was identified.

5. The tool of claim 1, wherein said means for assigning includes slots associated with each said interaction, to which a user can identify one or more of said entities involved in the interaction, and assign roles of each said entity played in the interaction.

6. The tool of claim 5, wherein said roles comprise affecters, affected and unassigned.

7. The tool of claim 6, wherein said roles further comprise mediator and unknown.

8. The tool of claim 1, further comprising a user context, wherein said means for text mining text mines based upon contents of said user context.

9. The tool of claim 8, wherein said user context comprises at least one entity or interaction.

10. The tool of claim 8, further comprising means for managing said user context, wherein said means for managing permits editing of an existing user context, as well as creation of a new user context.

11. The tool of claim 10, wherein said means for managing allows selection of specific entities and interactions to be added to said user context.

12. The tool of claim 10, wherein said means for managing allows direct inputting of entities and interactions into said user context.

13. The tool of claim 2, further comprising a user context, wherein said means for text mining text mines based upon contents of said user context; and

means for managing said user context, wherein said means for managing permits editing of an existing user context, as well as creation of a new user context.

14. The tool of claim 13, wherein said means for managing allows selection of specific entities and interactions to be added to said user context.

15. The tool of claim 13, wherein said means for managing allows direct inputting of entities and interactions into said user context.

16. The tool of claim 13, wherein said means for managing facilitates selection of local format representations of entities and interactions, and entering said local format representations into said user context.

17. The tool of claim 3, further comprising a user context, wherein said means for text mining text mines based upon contents of said user context; and

means for managing said user context, wherein said means for managing permits editing of an existing user context, as well as creation of a new user context, and wherein said means for managing facilitates selection of local format representations of entities and interactions generated from said manipulation of a biological diagram.

18. The tool of claim 8, further comprising means for managing aliases, wherein said means for managing aliases equates multiple names for the same entity, enabling said tool to identify each said entity by multiple names as they occur in the textual documents.

19. The tool of claim 18, further comprising means for resolving errors in alias management.

20. A tool providing interactive capabilities for user involvement in extracting and disambiguating biological information in text, said tool comprising:

a text viewer into which at least a portion of a textual document may be imported and viewed;

means for text mining the at least a portion of a textual document having been imported into the text viewer;

a list-based text editor that lists entities and interactions having been identified by said means for text mining;

a canvas area for diagrammatically representing said entities and interactions; and

means for populating diagrammatic renderings on said canvas with one or more of said entities and interactions identified by said means for text mining.

21. The tool of claim 20, further comprising means for representing said entities and interactions in a local format.

22. The tool of claim 21, further comprising means for generating, displaying and interactively manipulating a biological diagram, based upon the entities and interactions represented in said local format.

23. The tool of claim 20, wherein said means for populating includes means for assigning directionality of interactions.

24. The tool of claim 20, further comprising a palette for containing entities and interactions selected by a user from lists displayed by said list-based text editor, wherein said entities and interactions in said palette may be dragged to said canvas to populate a diagrammatic rendering.

25. The tool of claim 20, wherein, upon populating a diagrammatic rendering, assignments of roles played by entities populating said diagrammatic rendering are automatically assigned in a list displayed by said list-based text editor.

26. The tool of claim 20, further comprising means for adding elements to a diagrammatic rendering on said canvas by freehand sketching by the user.

27. The tool of claim 26, wherein each said entity and interaction displayed on said canvas and listed in said list-based text editor points back to a location of the portion of the textual document where it was identified.

28. The tool of claim 20, wherein said diagrammatic renderings are populated by selecting at least one entity or interaction from said list-based text editor and dragging to a desired location in a diagrammatic rendering displayed on the canvas.

29. The tool of claim 20, wherein said diagrammatic renderings are populated by selecting at least one entity or interaction from said text in said text viewer and dragging to a desired location in a diagrammatic rendering displayed on the canvas.

30. A tool for building biological networks of interactions from text, said tool comprising:

a text viewer into which at least a portion of a textual document may be imported and viewed;

means for text mining the at least a portion of a textual document having been imported into the text viewer;

a list-based text editor that lists entities and interactions having been identified by said means for text mining;

means for assigning directionality to the listed interactions; and

means for selecting interactions and associated entities in the list-based editor, merging common entities and displaying a resulting network of the interactions in a window of said text view or in a separate network viewer.

31. The tool of claim 30, further comprising means for representing said entities and interactions in a local format.

32. A tool for comparing extracted biological knowledge extracted from text, against an existing biological diagram, said tool comprising:

a text viewer into which at least a portion of a textual document may be imported and viewed;

means for text mining the at least a portion of a textual document having been imported into the text viewer;

a list-based text editor that lists entities and interactions having been identified by said means for text mining;

a diagram viewer and means for importing at least a portion of an existing biological diagram into said diagram viewer;

means for overlaying the identified entities and interactions on said at least a portion of an existing biological diagram that is displayed in said diagram viewer;

and means for visually distinguishing the overlaid entities and interactions from a remainder of the displayed biological diagram.

33. The tool of claim 32, further comprising means for representing said entities and interactions in a local format.

34. The tool of claim 32, wherein each said entity and interaction overlaid points back to a location of the portion of the textual document where it was identified.

35. The tool of claim 32, further comprising means for assigning directionality to the listed interactions; means for selecting interactions and associated entities in the list-based editor and populating diagrammatic renderings representing said selected interactions and associated entities, wherein said populated diagrammatic renderings are overlaid on the at least a portion of an existing biological diagram displayed in said diagram viewer.

36. The tool of claim 35, further comprising means for converting the at least a portion of an existing biological diagram to a local format, and based on values contained in the local format, comparing said diagrammatic renderings with corresponding parts of the existing biological diagram.

37. The tool of claim 32, further comprising means for automatically searching databases of existing biological diagrams that contain a user-specified set of interactions and returning those existing biological diagrams that contain the user-specified set of interactions to the user for display in said diagram viewer for use in overlaying and comparing the identified entities and interactions therewith.

38. A method of providing interactive capabilities for user involvement in extracting and disambiguating biological information in text, said method comprising the steps of :

importing at least a portion of a textual document into a text viewer;

text mining the at least a portion of a textual document to identify biological entities and interactions;

listing the identified entities and interactions in a list-based text editor; and

assigning directionality to the listed interactions by associating listed entities as affectors or affecteds with respect to the interactions.

39. The method of claim 38, further comprising representing said entities and interactions in a local format.

40. The method of claim 38, further comprising providing a user context, wherein said user context comprises data upon which said text mining is based.

41. The method of claim 40, further comprising managing said user context to edit the contents thereof or to create a new user context.

42. The method of claim 41, wherein said managing comprises selecting at least one entity or interaction and adding the selection to the user context.

43. The method of claim 41, wherein said managing comprises directly inputting at least one entity or interaction to the user context by a user, or editing existing data, by the user, in the user context.

44. The method of claim 41, wherein said managing comprises selecting at least one local format representation of an entity or interaction, and entering said at least one local format representation into the user context.

45. The method of claim 38, further comprising managing aliases of entities and interactions, to equate multiple names for the same entity or interaction, so that said text mining, listing and assigning directionality steps are carried out with respect to aliases of entities and interactions contained in the user context, as well as the actual names contained in the user context.

46. The method of claim 45, further comprising resolving errors in alias management.

47. The method of claim 46, wherein said error resolution is carried out interactively by a user.

48. The method of claim 39, further comprising at least one of the steps selected from the group consisting of:

generating a biological diagram based on said entities and interactions represented in said local format;

displaying a biological diagram based on said entities and interactions represented in said local format; and

interactively manipulating a biological diagram based on said entities and interactions represented in said local format.

49. The method of claim 38, further comprising:

converting at least a portion of a biological diagram to local format objects representing entities and interactions displayed in the biological diagram; and

inputting at least a portion of said local format objects into a user context; and,

performing said text mining based upon the contents of the user context.

50. The method of claim 38, further comprising linking each listed entity and interaction with a location in the textual document from which each listed entity and interaction was identified, respectively, using a local format.

51. The method of claim 38, further comprising the steps of:

providing a canvas area for diagrammatically representing said entities and interactions;

populating at least one diagrammatic rendering on the canvas with one or more of said entities and interactions identified by said means for text mining.

52. The method of claim 51, wherein upon said populating at least one diagrammatic rendering, assignments of roles played by said entities populating said at least one diagrammatic rendering are automatically assigned in a list displayed by said list-based text editor.

53. The method of claim 51, further comprising adding elements to a diagrammatic rendering on said canvas by freehand sketching by a user.

54. The method of claim 51, wherein said diagrammatic renderings are populated by selecting at least one entity or interaction from said list-based text editor and dragging to a desired location in a diagrammatic rendering displayed on the canvas.

55. The method of claim 51, wherein said diagrammatic renderings are populated by selecting at least one entity or interaction from said text in said text viewer and dragging to a desired location in a diagrammatic rendering displayed on the canvas.

56. The method of claim 38, further comprising:

performing a text search to identify a plurality of textual documents;

importing all or a subset of the plurality of documents into the text viewer; and

analyzing the textual documents in batch mode to identify interactions and entities to be listed in the list-based editor.

57. The method of claim 38, further comprising:

identifying aliases of at least one entity or interaction listed; and

performing operations on all aliases of the at least one entity or interaction simultaneously with performance of those operations on the at least one entity or interaction.

58. A method comprising forwarding a result obtained from the method of claim 38 to a remote location.

59. A method comprising transmitting data representing a result obtained from the method of claim 38 to a remote location.

60. A method comprising receiving a result obtained from a method of claim 38 from a remote location.

61. A method of providing interactive capabilities for user involvement in extracting and disambiguating biological information in text to be used in generating a biological diagram, said method comprising the steps of :

importing at least a portion of a textual document into a text viewer;

text mining the at least a portion of a textual document to identify biological entities and interactions;

listing the identified entities and interactions in a list-based text editor;

providing a canvas area for diagrammatically representing entities and interactions having been identified by said text mining; and

populating a diagrammatic rendering on the canvas with one or more of said entities and interactions identified by said means for text mining, including indicating directionality of at least one interaction represented by the diagrammatic rendering; wherein, upon populating the diagrammatic rendering, assignments of roles played by entities populating said diagrammatic rendering are automatically assigned in a list displayed by said list-based text editor.

62. The method of claim 61, wherein each said entity and interaction displayed on said canvas and listed in said list-based text editor is automatically linked with a location of each portion of the textual document where it was identified, using a local format.

63. A method for building biological networks of interactions from text, said method comprising the steps of:

importing at least a portion of a textual document into a text viewer;

text mining the at least a portion of a textual document having been imported into the text viewer;

listing entities and interactions having been identified by said text mining;

assigning directionality to the listed interactions; and

selecting interactions and associated entities and displaying a resulting network of the interactions and entities.

64. The method of claim 63, wherein said selecting and displaying include merging common entities to form a network of interactions and entities.

65. The method of claim 63, further comprising representing said entities and interactions in a local format.

66. The method of claim 65, further comprising the steps of:

converting the at least a portion of an existing biological diagram to a local format; and

based on values contained in the local format describing the existing biological diagram, comparing the selected entities and interactions with corresponding parts of the existing biological diagram.

67. The method of claim 63, further comprising the steps of:

automatically searching databases of existing biological diagrams that contain a user-specified set of interactions; and

returning existing biological diagrams that contain the user-specified set of interactions to the user for use in said overlaying the identified entities and interactions on at least a portion of an existing biological diagram.

68. A computer readable medium carrying one or more sequences of instructions for user involvement in extracting and disambiguating biological information in text to be used in generating a biological diagram, wherein execution of one or more sequences of instructions by one or more processors causes the one or more processors to perform the steps of:

importing at least a portion of a textual document into a text viewer;

text mining the at least a portion of a textual document to identify biological entities and interactions;

listing the identified entities and interactions in a list-based text editor; and

assigning directionality to the listed interactions by associating listed entities as affectors or affecteds with respect to the interactions.

69. The computer readable medium of claim 68, wherein execution of one or more sequences of instructions by one or more processors causes the one or more processors to perform the additional step of linking each listed entity and interaction with a location in the textual document from which each listed entity and interaction was identified, respectively, using a local format.

70. The computer readable medium of claim 68, wherein execution of one or more sequences of instructions by one or more processors causes the one or more processors to perform the additional steps of:

providing a canvas area for diagrammatically representing said identified entities and interactions; and

populating at least one of the diagrammatic renderings on the canvas with one or more of said entities and interactions identified by said means for text mining.

71. The computer readable medium of claim 70, wherein execution of one or more sequences of instructions by one or more processors causes the one or more processors to perform the additional steps of adding elements to a diagrammatic rendering on the canvas or creating a diagrammatic rendering on the canvas by freehand sketching.

72. The computer readable medium of claim 70, wherein execution of one or more sequences of instructions by one or more processors causes the one or more processors to perform the step of populating said diagrammatic renderings, upon selection of at least one entity or interaction from said list-based text editor and dragging to a desired location in a diagrammatic rendering displayed on the canvas.

73. The computer readable medium of claim 70, wherein execution of one or more sequences of instructions by one or more processors causes the one or more processors to perform the step of populating said diagrammatic renderings, upon selection of at least one entity or interaction from said text in said text viewer and dragging to a desired location in a diagrammatic rendering displayed on the canvas.

74. The computer readable medium of claim 68, wherein execution of one or more sequences of instructions by one or more processors causes the one or more processors to perform the additional steps of:

performing a text search to identify a plurality of textual documents;

importing all or a subset of the plurality of documents into the text viewer; and

analyzing the textual documents in batch mode to identify interactions and entities to be listed in the list-based editor.

75. The computer readable medium of claim 68, wherein execution of one or more sequences of instructions by one or more processors causes the one or more processors to perform the additional steps of:

identifying aliases of at least one entity or interaction listed; and

performing operations on all aliases of the at least one entity or interaction simultaneously with performance of those operations on the at least one entity or interaction.